

CLAIMS

1. A method of making a pneumatic tire,
said pneumatic tire comprising
a tread portion,
a pair of sidewall portions,
a pair of bead portions,
a carcass extending between the bead portions, and
a belt disposed radially outside the carcass in the
tread portion, said belt composed of a breaker and
a band disposed on the radially outside of the
breaker,
said method comprising
applying a raw breaker material to a cylindrical drum,
spirally winding a plurality of parallel band cords
around the raw breaker material on the cylindrical
drum so that angles of the windings are not more
than 5 degrees with respect to the tire equator,
and
gradually increasing one of
(1) an average density of the band cords in the tire
axial direction and
(2) an average tension of the band cords in the tire
axial direction
from a center portion of the band towards each axial
edge of the band during winding the band cords.
2. The method according to claim 1, wherein
the average density D_c of the band cords at a position P_c
at the tire equator,
the average density D_n of the band cords at any position

Pn at a certain distance (Ln) from the tire equator,
the radius Rc of the inner surface of the band in the
finished tire at the positions Pc, and
the radius Rn of the inner surface of the band in the
finished tire at the positions Pn
satisfy the following condition

$$Dn = Dc \times (Rc/Rn).$$

3. The method according to claim 1, wherein
the average density Dc of the band cords at a position Pc
at the tire equator,
the average density Dn of the band cords at any position
Pn at a certain distance (Ln) from the tire equator,
the radius Rc of the inner surface of the band in the
finished tire at the positions Pc, and
the radius Rn of the inner surface of the band in the
finished tire at the positions Pn
satisfy the following condition

$$Dc \times (Rc/Re) < De \leq 3.0 \times Dc \times (Rc/Re)$$
4. The method according to claim 2 or 3, wherein
said plurality of parallel band cords traverse the
cylindrical drum along the axis of the drum, and the traversing
speed is continuously changed, while rotating the drum at a
constant speed, whereby the average density is gradually increased.
5. The method according to claim 1, wherein
the average tension Tc of the band cords at a position Pc
at the tire equator,
the average tension Tn of the band cords at any position

Pn at a certain distance (Ln) from the tire equator,
the radius Rc of the inner surface of the band in the
finished tire at the positions Pc, and
the radius Rn of the inner surface of the band in the
finished tire at the positions Pn
satisfy the following condition
$$T_n = T_c \times (R_c/R_n).$$

6. The method according to claim 1, wherein
the average tension Tc of the band cords at a position Pc
at the tire equator,
the average tension Tn of the band cords at any position
Pn at a certain distance (Ln) from the tire equator,
the radius Rc of the inner surface of the band in the
finished tire at the positions Pc, and
the radius Rn of the inner surface of the band in the
finished tire at the positions Pn
satisfy the following condition
$$T_c \times (R_c/R_e) < T_e \leq 3.0 \times T_c \times (R_c/R_e).$$